

Identification of Common Fruitflies (Tephritidae : Diptera) of India

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Fruitflies are of great economic importance. They are serious pests of vegetables, fruits and ornamental plants. They lay eggs in living healthy plant tissue and the larvae feed in the stalks, leaves fruits and flower heads or seeds. In India fruitfly pests mainly belong to the sub-family Dacinae. A list of the host plants of Indian fruitflies has already been published by the another (1970).

A lot of taxonomic work is being undertaken on these flies in other countries while in India this group is largely neglected. Moreover, work relating to the identification of common fruitflies is not available at one place. Keeping in mind the needs of the field workers, easy keys are being provided for separation of the common species.

Collection

Fruitfly adults can be collected by insect net or by baiting. These should be immediately pinned and kept in the insect box. The specimens reared from infested vegetables and fruits must be kept alive at least for 4 days and fed on 25% honey from a cotton swab. The freshly emerged adults are soft-bodied and their wings are folded. They must be given time to expand their wings, harden their bodies and to develop colour so that it may be possible to identify them.

The specimens when preserved wet, must be kept in 70% alcohol. All specimens whether pinned or preserved in alcohol should carry appropriate label indicating name of the collector, host, locality, date etc.

To study the taxonomic characters more clearly it is always desirable to take dry specimens. The specimens preserved in alcohol can be mounted on pins employing the technique of Sabrosky (1966).

Identification

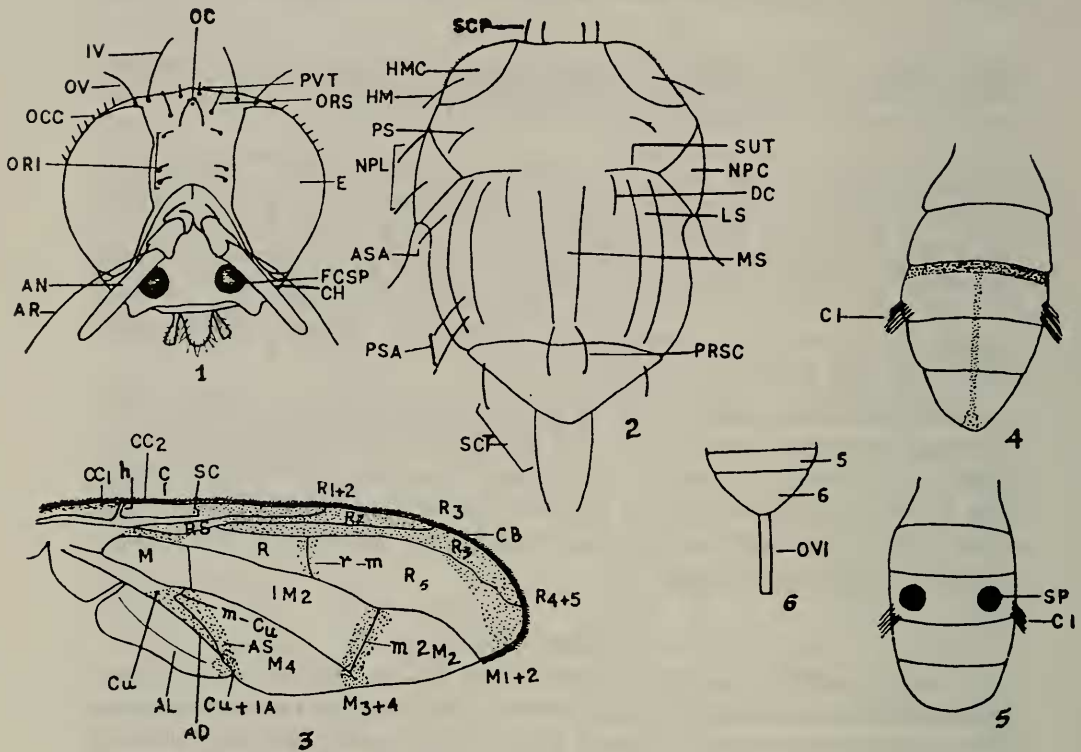
The identification of the species involve many characters but here only the important ones are given.

The family characters are presence of lower orbital bristles (fig. 1) and the subcosta is bent forward at approximately right angle and fading out before reaching costa (fig. 3).

Important characters used in identification

Head (fig. 1). The bristles are important in taxonomy. Cheeks broad or narrow. Face with or without brown or black spots which vary in shape. Antennae short or long; 1st and 2nd seg-

ments usually short, 3rd slightly or distinctly longer than broad and rounded or pointed apically.



Thorax (fig. 2). Dusty or dustless, with or without pubescence; here also the bristles are taxonomic characters. The anterior supra-alar bristle is inconspicuous. It is present on the side of the dorsum, a little in front of the root of the wings. Spots on the thorax are also important. A yellow lateral stripe is present on either side on the dorsum behind the suture and, sometimes a median one is also present; the scutellum is usually pale yellow sometimes provided with dark spots.

Abdomen (fig. 4). Dusty or dustless with or without pubescence; cylindrical or petiolated. The tergites may be free or fused; when free each tergite overlaps the preceding one and when "fused" (fig. 5) they are united firmly along their adjacent margins. Third tergite ciliated or non-ciliated. Ovipositor short or long (fig. 6).

Wings: Hyaline except the costal margin which may be narrow or broad, ending between R4+5 and M1+2 (fig. 3), apically the costal band may be broadly dilated; sometimes the costal band is very narrow and ends at or near R1 and in this case a small isolated dark spot usually present covering vein R4+5 at both ends. Anal stripe is narrow, wide, or absent; pale, black, or brown; extending from the cubital cell to the point of dilation of the cell or up to Cu+IA; the apical dilation of the Cubital cell may also be absent, the wings may be banded or reticulate i.e. dark ground colour with numerous rounded small hyaline spots.

A dark pale, brown, or black, narrow stripe may cover the cross-vein 'm' or r+m, also dark spot sometimes present in between the cell 'M' and base of the radial sector.

Dacinae

The fruitflies belonging to the subfamily Dacinae are serious pests of fruits and vegetables and occur throughout India. In India this subfamily is represented by three genera, of which *Dacus* Fb. is the most important.

The members of this group are medium to large sized; brown, ferrugineous, pale-yellow, or black. The chaetotaxy is reduced and the enlarged 2nd basal cell in the wing is important for separating the species.

Separation of species

- (A) Large sized; scutellar bristles 2 or 4; costal band broad and anal stripe well developed.
- (a) Three pairs of lower orbital bristles and one pair of scutellar bristles; costal band broadly dilated at the apex; hind cross-veins thickly margined with brown
cucurbitae (Cocquillet)
- (b) Two pairs of lower orbitals and two pairs of scutellar bristles; costal band thick nearly of equal thickness throughout, hind cross veins not margined
tau (Walker)=*hageni*
- (B) Small to medium -sized; scutellar bristles always 2; costal band narrow or incomplete; anal stripe narrow or absent.
- (a) Tergites fused and look like a hemispherical capsule; anterior supra-alar bristles absent; oval black spot present on either side of 3rd tergite *ciliatus* (Loew)
- (b) Tergites free; anterior supra-alars present; oval spots not present on 3rd tergite.
- (1) Costal band narrow, nearly of equal width up to the end; anal stripe narrow.
- (i) Thorax greenish black, also with a yellow middle stripe; male without cilia on 3rd abdominal tergite; ovipositor very long and thin (fig. 6).
diversus (Coquillett)
- (ii) Thorax ferrugineous, without yellow middle stripe; male with cilia on 3rd abdominal tergite; ovipositor short and thick *dorsalis* (Hendel)
- (2) Costal band incomplete with an isolated spot at the end of the wing; anal stripe absent; pleural region with usual yellow markings.
- (i) Body yellowish-red, facial spots rounded and always distinctly isolated; in ♀, ovipositor red but with black end; pale yellow band on third tergite *zonatus* (Saunders)
- (ii) Body blackish-brown, facial spots very close to each other or more or less joined in the middle to form a transverse band; ovipositor red *correctus* (Bezzi)

Trypetinae

Chaetotaxy complete; wing with dark cross bands or spots, sometimes with hyaline incisions but never reticulate; 2nd basal cell small, 6th abdominal tergum shorter than 5th in the female, scapular bristles present.

Myiopardolis pardalina Bigot and *Carpomyia vesuviana* Costa are the most important and common species of this subfamily. The former is a serious pest of melons, while the latter is serious pest of *ber*. These can be easily identified as below.

Cheeks narrow; ocellar bristles absent; no median black line on thorax; two oval spots, very much approximated to each other, present posteriorly on scutellum; basal part of wing from cubital cell to one-third of 2nd costal cell black

C. vesuviana

Cheeks broad; ocellar bristles present; median longitudinal line on thorax present; only one medio-posterior axe-shaped spot with semi-circular posterior margin on scutellum; 1st costal cell and basal part of 1st basal cell hyaline

M. pardalina.

Tephritinae

Chaetotaxy complete; wing reticulate; 2nd basal cell small; 6th abdominal tergum as long as the 5th or longer, scapular bristles usually absent.

In this subfamily one species, *Acanthiophilus helianthi* Rossi is widely distributed in India. It is a serious pest of flower heads of the plants belonging to the family Compositae especially sunflower and safflowers. This species can be easily distinguished by the following characters:

Black; 3rd antennal segment pointed at the end; frons brownish-yellow, about one and a half times as long as broad; bristles black except yellow occipitals; thorax and abdomen with grey pubescence; dorso-central bristles just behind suture; wings hyaline except outer half tending to become reticulate and with rays apically (more distinct in ♂); ovipositor very long, basal three-fourth part provided with white hairs.

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References

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Abbreviations

A D—Apical dilation of cell Cu; A L—Axillary lobe; A N—Antenna; A R—Arista A S—Anal stripe; A S A—Anterior supra-alar bristle; C—

Costal vein; C B—Costal band; C C 1, C C 2—Costal cells 1, 2; C H—Cheeks; C I—Cilia; Cu—Cubital cell; Cu+I A—Cubital vein combined with first anal vein; D C—Dorso-central bristle; E—eye; F C S P—Facial spot; h—Humeral cross vein; H M—Humeral bristle; H M C—Humeral callus; I V—Inner vertical bristle; L S—lateral stripe; m—Medial cross vein; M (1+2; 3+4) Medial veins; M—2nd basal cell; 1 M 2—Discoidal cell; 2M₂—2nd posterior cell; M₃—3rd posterior cell; m—cu—Medial-cubitus cross vein; M S—Median stripe; N P C—Notopleural callus; N P L—Notopleural bristles; O C—Ocelli; O C C—Occipital bristles; O R I—Inferior orbital or lower orbital bristles; O R S—Superior orbital or upper orbital bristles; O V—Outer vertical bristles; O V I—Ovipositor; P R S C—Prescutellar bristles; P S—Praesutural bristle; P S A—Posterior supra-alar bristles; P V T—Postvertical bristles R(1; 2+3; 4+5)—Radial veins; R—1st basal cell; R₂—Marginal cell; R₃—Submarginal cell; R₅—1st posterior cell (inside wing); r—m—Radio-medial cross vein; R S—Radial sector; S C—Subcostal vein; S C P—Scapular bristles; S C T—Scutellar bristles; S P—Spot; S U T—Suture.

Notes and Observations

BREEDING EUROIS OCCULTA L. THE GREAT BROCADE.—Although some species which hibernate as larvae are quite easy to breed, others seem to be difficult and casualties are often heavy.

On the 15th August 1971 Mr R. F. Bretherton gave me 42 ova of that fine moth *E. occulta* L., the great brocade, from a female taken in Scotland. These hatched the same day and began feeding quite freely on willow and birch. They were kept indoors in a warm room. Growth however was extremely slow, except for one larva which grew very rapidly and was soon many times the size of the others.

On the 6th November this larva pupated, the remainder (38 in all now) still being very small.

By now willow and birch were almost unobtainable and I had the choice of allowing them to go into hibernation or of trying more drastic methods. I, therefore, switched the food plant to bramble and kept the larvae very close to a radiator where the temperature was 65° to 70° by day and 55° by night. They were kept in plastic sandwich boxes, initially 12 to a box and later 6, the boxes being well lined with tissue changed daily.

This atmosphere clearly suited the larvae as they began to grow rapidly, though at very varying rates. There were, however, occasional casualties.

On the 18th December a moth emerged from the larva which had pupated on 6th November. A number of other larvae were now almost full fed and the second and third pupated on 28th and 31st December respectively.

From then onwards further larvae pupated at intervals of a few days the last doing so on 27th January 1972, when four rather sickly larvae were still feeding. All these died during February.